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HISTORY OF MENTAL CONCEPTS

A dynamic interplay between positive and negative factors in insanity. Levels of dissolution and mental symptoms

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This article presents parts of two writings explaining the role and the levels of dissolution in the pathogenesis of nervous and mental disorders. A strong influence comes from modern theories about evolution, particularly Spencer. The model was developed starting from nervous diseases (It is particularly famous Jackson's study of epilepsy) but it had fruitful consequences also for psychiatric conditions. Here we focus more on the part on "insanities", with Jackson important ideas about the "constructive", or "positive" component of mental symptoms. Positive parts of symptoms are due to the liberation of normal-functioning centers, due to lack of inhibition rather than direct dysfunctions. The disturbances of consciousness and their role in illusions and hallucinations is also sketched.

Keywords: History of psychiatry, history of neurology, positive and negative symptoms, evolution theory

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INTRODUCTION (BY THE EDITOR OF THIS JOURNAL)

In neurology, the contribution of Hughlings Jackson is well established. On the contrary, in psychiatry Jackson is like a phoenix; famous in some periods, forgotten in others, periodically resurges depending on the "psychiatric fashion" of the time shaping the psychiatric debated.

Properly used in the construction of Henri Ey's organodynamism (Ey, 1938; Azima, 1953; Aragona, 2020); less properly quoted to discuss Tim Crow's (1985) distinction between positive and negative symptoms of schizophrenia (Berrios, 1985), Jackson is now enjoying a new period of fame due to the resurgence of psychopathogenetic theories based on consciousness disturbances (e.g. Meares, 1999; van der Hart et al., 2006; Scalabrini et al., 2020).

In this article, we present two parts of different Jackson's contributions.

The first part is from his writing "The factors of insanities" (Jackson, 1894), which is considered:

> "important, for it includes the last summary of Jackson's views on the nature and formation of mental symptoms. […] a good instance of how English physicians thought at a time when neurology had not yet been constructed and when 'mental disorders' and 'neurological diseases' were still in the same nosological box; indeed, FI [Factors of Insanities] makes a case for keeping them together" (Berrios, 2001, p.353).

The second part, from the second volume of the "Selected writings" (Jackson, 1932), adds further remarks on the role of the dissolution of the nervous system in epilepsy, with interesting observations on particular states of consciousness (e.g. delirium in non-cerebral diseases, drunkenness, and also dreams while sleeping). Although they are only drafted, there are also thought-provoking remarks about the philosophical question of the distinction between brain and mental disorders and the role of brain in mental pathology.

The aim of this article is to give the reader a first-hand experience of the theoretical force and empirical possibilities of application of Jackson's theories. At the same time, it shall be noted that his theories are strictly related to the evolutionist scientific spirit of his time (mainly influenced by Spencer), and that a systematic application to psychopathological conditions is probably impossible.

A sort of pan-dissociative psychopathology (i.e., all disorders explained as effect of traumatic experiences on consciousness states and structure) seems unlikely. However, dissociative states are now recognized at the basis of several disorders, including some complex post-

traumatic developments leading to personality disturbances previously interpreted as part of the construct of borderline personality.

The psychopathological interpretations of such constructions, as well as those of traumatic hallucinations, delusional bouffées, etc., may benefit from the resurgence of Jackson's ideas.

PART ONE
THE FACTORS OF INSANITIES

I have often urged that for the scientific study of maladies of the Nervous System we should investigate them as Dissolutions (reversals of Evolution) of this or that part of the nervous system; we must also take into account the undamaged remainder — the evolution still going on in what is left intact of a nervous system mutilated by disease. The supposition is that the principle indicated will ultimately be found to apply to all nervous maladies — from those produced by lesions at the periphery of the nervous system, to those produced by lesions of the highest cerebral centres — from, for example, those produced by lesions of nerve trunks to ocular muscles, to cases of insanity. I have never put forward the opinion that nervous maladies should be classified on the principle of dissolution for clinical purposes, but, on the contrary, have urged that for those purposes we should continue our empirical arrangements of cases by types. In particular I have urged the necessity of arrangements by type of cases of Insanity for clinical purposes, as well as the study of them, as they exemplify Dissolution of the highest cerebral centres. It would be as absurd to attempt to arrange patients in an Asylum on the principle of Dissolution as it would be to arrange plants in a kitchen garden on the "natural system" of botanists.

In every insanity there is morbid affection of more or less of the highest cerebral centres or, synonymously, of the highest level of evolution of the cerebral subsystem, or, again synonymously, of the anatomical substrata, or physical basis, of consciousness. There may be discoverable disease destructive of nervous elements, or there may be loss of function from some undiscovered pathological process inferred from symptoms.

In every insanity more or less of the highest cerebral centres is out of function, temporarily or permanently, from some pathological process ; for my present limited purpose it matters little what that process may be. It only matters as the pathological processes produce loss of function, that is Dissolution, of more or less of the highest centres, *at different rates* (Factor 3).

I do not use the term "function" in the sense often given to it in clinical accounts of nervous maladies, as, for example, when it is said of a patient that his "case is entirely functional." I do not believe that there is such a thing as loss or defect of function of any nervous elements without a proportionate material alteration of their structure and nutrition. Of course the separation into structure, nutrition and function of the nervous system is artificial ; it is merely a convenient device, just as the separation into the surface, weight and mass of a body is.

I think a better term for my present purpose than "loss of function" would be "negative lesion"; the latter term would include not only destruction of nervous elements, but also all other conditions of nervous elements from which they function no longer, for example cases where, as after an epileptic fit, certain cells and fibres, or the endings of fibres, are, for a time, of no use.

If a man be so soundly asleep that he cannot be awakened, there is for the time being no help to be had from him any more than there would be if he were dead. There is a difference between destruction of nervous elements symbolised by the dead man and the temporary condition of them after an epileptic fit symbolised by the man deeply asleep, but *for the time being*, during the existence of the insanity, the cases are alike in that more or less of the highest cerebral centres is functionally absent, although in the former they are structurally absent too. Recovery (re-evolution) may occur in the latter, but does not occur in the former.

Whilst studying insanities as dissolutions we consider them so far as we can as they are *departures from* mentation concomitant with normal states of the highest cerebral centres, and not as we do for clinical purposes as they *approach* certain clinical types, melancholia, general paralysis, &c. Hence we take heed of delirium in non-nervous maladies, in pneumonia

for one example, of cases of poisoning by belladonna and cannabis indica and of degrees of drunkenness from alcohol, as well as of cases of insanity ordinarily so called.

Enough attention is not given in certain cases to degrees of insanity. Whilst epileptic (post-epileptic I think) mania is thought of as an insanity, coma after a severe epileptic fit is not regarded as an insanity. Yet post-epileptic coma is acute temporary dementia, and is psychically a greater degree of the negative mental element which co-exists with a super-position element in post-epileptic mania. There are many degrees of post-epileptic states from slightest confusion of mind to deepest coma; in a scientific regard all these degrees of insanity should be taken into account.

Dreaming has long been likened to insanity. I suggest several degrees of the normal dissolution of sleep. (1) Sleepiness, (2) Sleep with dreaming, (3) Sleep with actions (somnambulism), and (4) Deep, so-called dreamless, slumber. At least 2, 3 and 4 ought to be considered as different depths of dissolution of the highest cerebral centres, with, in 2 and 3, and possibly in 4, lower ranges of evolution remaining in those centres.

There are four Factors in Insanities. (1) There are different Depths of Dissolution of the highest cerebral centres. (2) There are different Persons who have undergone that Dissolution. (3) There are different Rates with which the Dissolution is effected. (4) There is the Influence of different Local Bodily States and of different External Circumstances on the persons who have undergone that Dissolution.

Although I speak of Dissolution of the highest cerebral centres as if it were uniform — as if all the divisions of these centres were "evenly" affected — it is clear enough that there are local Dissolutions of those centres. That there are different *kinds* as well as different *degrees* of insanity is evident — melancholia and general paralysis for two examples. Different regions of the highest cerebral centres undergo dissolution in different *kinds* of insanity. I shall nevertheless in this brief sketch (except incidentally for purposes of illustration) ignore *local* dissolutions of the highest cerebral centres and speak of different degrees of insanity as if the Dissolutions of those centres producing them were uniform. If we did consider local dissolutions of the highest cerebral centres we should have to say that there are five factors in insanities.

It is obvious that when studying insanities as Dissolutions — as reversals of evolution — of the highest cerebral centres we are making, by help of what may figuratively be called the experiments of disease, a study in psychology as well as one in the anatomy and physiology of a certain part (highest cerebral centres) of the nervous system. For, as I have said and I shall speak at more length on the matter later, we have in these cases to take into account not only the depths of dissolution of these centres, but also the evolution going on in the undamaged remainder of them — the mentation remaining possible when these centres have been mutilated in different degrees.

1. FIRST FACTOR IN INSANITIES. DIFFERENT DEPTHS OF DISSOLUTION

No centres are in layers, but for simplicity of illustrations I shall imagine that the highest cerebral centres are in four layers, A.B.C.D. In accord with this I make, still arbitrarily of course, four depths of Dissolution of these centres, and, correspondingly, four degrees of insanity.

A. First Depth.
First degree of Insanity

In this depth the first, we may say topmost, layer of the highest cerebral centres is rendered functionless by some pathological process.

[…]

I am obliged to stay here to consider a matter to which I attach extreme importance. I submit that, with obvious exceptions, the symptomatology of nervous maladies in which there are negative lesions is made up of two opposite elements, one negative, alone produced by disease, and one positive, or super-positive, the outcome of activities of healthy nervous arrangements. The simplest illustration of this dictum is given by the symptomatology of paralyses of ocular muscles from disease of the motor nerve trunks supplying them. In this paper I illustrate the dictum by the first depth of dissolution of the highest cerebral centres, first degree of insanity.

Whilst noting that in this, the first, degree of insanity, the layer A is out of function, possibly permanently, we have to keep vividly in mind that the three other layers are intact. The only thing disease, in the proper sense of pathological process or result of one, has done, is to render functionless or to destroy the layer A, and we have necessarily to take into account the intactness, the functionability, of the layers, B, C and D. I now try to show the importance of this.

In every insanity, with one obvious exception, (complete dementia), there is a double symptomatic condition, a condition of two opposite mental elements, one negative and one positive (or super-positive). Repeating what has just been said, there is in every insanity (1) negatively, defect of consciousness (loss of some consciousness), and there is (2) the consciousness remaining. In the first depth of Dissolution the physical condition corresponding to the defect of, loss of some, consciousness is the abrogation of A; the physical condition corresponding to the consciousness remaining is the intactness of B, C and D. In other words disease only causes the physical condition corresponding to the negative mental element, defect of consciousness; the positive symptoms signify, or rather they sample, the consciousness remaining, and are the outcome of activities of the layers B, C and D, which are perfectly healthy.

Putting the matter differently we have not only to take into account the dissolution of the one layer A caused by the disease, but the Evolution going on in the layers B, C and D, which no pathological process has touched.

In every case of insanity, short of dementia, there is a problem in evolution as well as one in dissolution. We may say that "to undergo dissolution," to lose A for example, and "to be reduced to a lower range of evolution," to B, C. and D in the example taken, are equivalent expressions.

Dissolution and Evolution in cases of insanity vary inversely — the shallower the Dissolution the higher the range of evolution remaining; conversely, the deeper the Dissolution the lower the range of evolution remaining. Correspondingly the shallower the Dissolution the less consciousness is lost and the more of it remains. In other words the slighter the Dissolution the less the negative mental state and the more elaborate the mentation remaining possible.

I will now try to illustrate the duplex mental state in insanities. Suppose a patient imagines, to take one delusion as a sample of his mental condition, that his nurse is his wife. It is not enough to dwell only on the positive element, that he supposes the person attending on him is his wife, for this delusion of necessity implies the co-existing negative element that he does not know her to be his nurse (or some woman not his wife). His "not-knowing" is a sample of the result of disease (Dissolution of A); his "wrong-knowing" is a sample of the outcome of what is left intact of his highest cerebral centres (Evolution going on in B, C and D).

I now take for further illustration a case of insanity from what I suppose to be a Local dissolution of the highest cerebral centres. When a general paralytic believes he is Emperor of Europe, I submit that this delusion (the patient's belief) arises during activity of perfectly healthy nervous arrangements, presumably those of the posterior lobes and those left intact of the anterior. The disease of the anterior lobes is responsible for his not knowing that he is X.Y., a clerk in the City.

Illusions, delusions, extravagant conduct and abnormal emotional states in an insane person signify evolution, not Dissolution ; they signify evolution going on in what remains intact of the mutilated highest centres — in what disease, effecting so much dissolution, has spared. The positive mental states mentioned imply the co-existing negative mental states, defective perception, less reasoning power, less adaptation to present surroundings and absence of the "finest" emotions (in comparison with the former, sane, person). To take examples, Any illusion implies that a thing is not recognised as it would have been before the insanity, and this means that there is a coexisting negative mental element; any delusion implies that the patient does not believe as he would have done before he underwent Dissolution, and this means that there is a co-existing negative mental element.

To resume: In the first depth of Dissolution the negative mental state is slight, the dissolution being very shallow; the positive mental state is

very elaborate, the range of evolution remaining being very high. This depth (first degree of insanity) may be symbolized as -A+B+C+D. In fact the whole person is now B+C+D. The term -A is only given to indicate how the new person, the man insane, B+C+D differs from the former person, the sane man, A+B+C+D. Suppose the sane man is X, then the insane man, the new person Y, is X -A, that is Y is B+C+D. And here when using the term "new person" for Y, we must urge that what we call his delusions are his beliefs, and most generally his positive mental "symptoms" are samples of a mentation which is only abnormal in contrast with the mentation of the prior self X (or with that of some arbitrary standard of sanity).

B. Second Depth of Dissolution.
Second Degree of Insanity

Let us imagine that disease (any pathological process productive of loss of function whether there be destruction also or not) has affected not only A but B also. Now the negative mental element, defect of consciousness, is greater and the positive less; less consciousness is retained. Correspondingly since the dissolution is deeper, A and B, the range of evolution is shallower, C and D. This depth may be symbolised as -A-B+C+D. The new person is C+D.

C. Third Depth of Dissolution.
Third Degree of Insanity

Let us imagine that the layers A, B and C have been put out of function. Now the negative mental element is very great and the positive very little. Correspondingly the Dissolution is very deep; the range of evolution remaining only D, is very shallow. This depth may be symbolized as -A-B-C+D. The new person is now D.

D. Fourth Depth of Dissolution.
Fourth Degree of Insanity

Let us imagine that the layers A, B, C, and D are rendered functionless. Here the negative mental affection is greatest, is indeed total; there is dementia. There are no positive mental symptoms; there is no mind or consciousness. There is complete Dissolution, and thus no lower range of evolution remains. Here is what I called "the obvious exception" to the statement that the mental condition in insanities is a double condition, one of a negative and a positive element. In the fourth depth there is no person, but only a living creature.
[…]

2. THE SECOND FACTOR IN INSANITIES. THE PERSON WHO HAS UNDERGONE DISSOLUTION

This factor may seem to need little illustration. It is obvious that the insanity will vary according as the person who has undergone Dissolution of his highest cerebral centres is a child or an adult or an old man, clever or stupid, intelligent or unintelligent, educated (trade, &c., included) or non-educated. At any rate, it is obvious when the Dissolution is but of little depth.

Here has to be considered the question of heredity of insanity. I submit that no one inherits a tendency to insanity in the sense that he inherits a tendency to disease (pathological process) of any part of his brain. He inherits a healthy brain, but a smaller one than the average; I do not mean smaller morphologically, but smaller in the anatomico-physiological sense that he has fewer functional elements in the highest ranges of his highest cerebral centres. He inherits a brain which will "give out" more easily under unfavourable influences than the brain of the average man.

3. THE THIRD FACTOR IN INSANITIES. RATE WITH WHICH DISSOLUTION IS EFFECTED (RATE OF REMOVAL OF CONTROL FROM RANGES OF EVOLUTION REMAINING)

The more rapidly the Dissolution is effected the greater is the activity on the range of Evolution remaining. To take extreme cases. The senile dement undergoes Dissolution very slowly. The post-epileptic maniac has undergone dissolution with extreme rapidity. The former is quiet, the latter is very busy. In the former control is slowly, in the latter rapidly, removed from the lower ranges of evolution remaining.

Taking the first Depth of Dissolution for illustration we may symbolise the first factor and the third factor.

In two patients the symbolisation as to factor 1 is –A+B+C+D. But in one of them Dissolution

of A is rapidly effected, in the other slowly; this means that control is rapidly removed from B+C+D in one and slowly in the other. So that in one the layers B, &c., are very over-active, in the others they are more nearly normally active. We may symbolise the two, one as -A+B'''+ C''+D' and the other as -A+B+C+D.

4. FOURTH FACTOR IN INSANITIES

There is the influence of local bodily states and of external circumstances. A healthy man has muscæ from intra-ocular specks; they seem like moving spots and films in front of him. But suppose he undergoes Dissolution (as in cases of Delirium Tremens) and that there is the first depth of dissolution; then he sees mice and rats. Speaking roughly the muscæ "turn into" those animals for him. The most striking illustrations of the fourth Factor are given by provoked dreams in the normal dissolutions of sleep; cramp in a sleeper's finger develops the dream that a cat is biting his finger.

What we call external circumstances are perhaps artificially separated from "local bodily states." If a man had been reading about kings he might, if he became insane soon afterwards, believe himself to be a king. What was doing just before an epileptic fit may influence the patient's actions in the temporary insanity after it.

COMPLICATION OF FACTORS

Although it is necessary for clearness to speak of the factors seriatim, it is evident enough that each must not be thought of in isolation from the others. As in different Insanities there are different depths of Dissolution of the highest cerebral centres, as the persons who undergo dissolution are different, as dissolution is effected at different rates and as the local bodily states and external circumstances of different patients are not the same, we may say that every case of Insanity is a "function of four variables."

With regard to what we may call the Complications of the Factors, it is of no use speaking of the fourth depth of dissolution — dementia. In this depth there are no longer highest cerebral centres, there is no mind, there is no person, the rate with which dissolution is effected, when that dissolution is established, is of no consequence and local bodily states and external circumstances have nothing to influence. In what follows I shall ignore the fourth depth of dissolution.

Obviously the deeper the Dissolution the less we are concerned with the factors 2, 3, and 4. There is in deep dissolution reduction towards what we may rudely call a general personality, one in which individual peculiarities are more or less effaced — a reduction, still speaking rudely, towards what is common to the race. And in deep Dissolution the rate with which it is effected is of less consequence than in shallow Dissolution, the range of evolution remaining in the former case to be in over-activity from rapid removal of control being less. Further, in deep Dissolution there remains little range of evolution for local bodily states and external circumstances to act on.

We may say that the shallower the Dissolution the more elaborate is the mentation possible, the greater difference does the rate with which Dissolution is effected make in the activity of the lower range of evolution remaining, the more is there retention of "individual peculiarities" and the more do local bodily states and external circumstances influence the mentation still possible.

This must suffice, although many qualifications might be mentioned. The word "elaborate" may mislead. Although speaking generally, the shallower the Dissolution the more elaborate the actions possible, it is obvious that in comparatively deep Dissolution very elaborate actions may remain if the nervous arrangements for them have been (Factor 2) strongly organised, as, for example, manipulations of trade, &c.

I have in the foregoing spoken of insanities as if in all cases the disease producing dissolution were primarily of the brain. But I think that in many cases of insanity the brain suffers secondarily, for example, in acute non-cerebral maladies, such as pneumonia, when they are attended by delirium.

We have to bear well in mind that there are, broadly speaking, two factors in the physical processes corresponding to the mentation of healthy people. I cannot here go fully into this question. A man may have a highly developed brain, but not the full use of it, if the subserving organs (of digestion, circulation, &c.) are not

well developed, or have become inefficient. Such a man may have many fine thoughts, and yet no system of thinking; his brain soon falls out of gear when dealing with complex subjects. And I believe that some cases of insanity ordinarily so-called, are owing not to primary disease of the brain, but to failure of the brain, because it is ill-served by the circulatory and other "vital" systems.

I think it is a legitimate hypothesis that the mental disorder from poisoning by belladonna — to take for definite illustration that artificially produced temporary insanity — is mainly owing to failure of the subserving systems (digestion, circulation, respiration) and not entirely, possibly not at all, to direct action of the drug on the so-called "organ of mind" itself.

Atropine is known to poison certain nervous elements of the lowest level for regulating the circulatory and other "vital" systems and connections of those elements with the organs of these systems. The cerebral hemisphere will suffer according to the degree of ill-service by the organs of the four "vital" systems thus put in difficulties by the poison, I hope to consider this aspect of insanity on another occasion.

PART TWO
REMARKS ON DISSOLUTION OF THE NERVOUS SYSTEM AS EXEMPLIFIED BY CERTAIN POST-EPILEPTIC CONDITIONS

In his *Data of Ethics*, Herbert Spencer (1879, p.61) writes: " Every science begins by accumulating observations, and presently generalises these empirically; but only when it reaches the stage at which its empirical generalisations are included in a rational generalisation *does it become developed science*. Astronomy has already passed through its successive stages: first, collection of facts; then, deductions from them; and lastly, deductive interpretations of these, as corollaries from the universal principle of actions among masses in space."

I have long thought that Herbert Spencer's hypothesis of dissolution will enable us to develop a science of diseease of the nervous system. Dissolution is the term Spencer uses for the reverse of evolution. At any rate, there is no harm in trying to see how far the hypothesis of dissolution will apply to some diseases of the nervous system. I have long ago applied it to the elucidation of cases of aphasia' to cases of the ordinary form of hemiplegia and to cases of epileptiform seizures (*Lancet*, January 18, 1873, vol. i, p. 62). I suppose these to be examples of dissolution beginning in different lower cerebral centres, as insanity is, I suppose, dissolution beginning in the highest of all centres. I have also long ago applied the hypothesis to the investigation of cases of insanity as in a paper, *Medical Times and Gazette*, July 19, 1873, where, however, I did not use the term dissolution (see also *Medical Press and Circular*, December 9, 1874, and *London Medical Record*, June 9, 1875).

I have been misunderstood to have put forward the hypothesis of dissolution as a basis for classification of cases of insanity for clinical purposes, and have been asked to go to some lunatic asylum and show how the cases of patients there could be classified under it. That I may in some of my earliest papers on the application of the hypothesis of dissolution have so carelessly written as to imply that I dare not deny; I hope I have not. But I have expressly repudiated such application of the hypothesis in several places some years ago.

[…]

… not only cases specially described by alienists, but delirium in acute non-cerebral disease, degrees of drunkenness, and even sleep with dreaming, are related one to another. Dreaming is for such purpose as important as any kind of insanity. More than this, we require a rational generalisation so wide as to show on the physical side relations of diseases of the mind, which are for physicians nothing but diseases of the highest centres, to all other diseases of the nervous system. We have to find some fundamental principle under which things so superficially different as the diseases empirically named hemiplegia, aphasia, acute mania, chorea, melancholia, permanent dementia, coma, etc., can be methodically classified.

[…]

It is impossible to study cases of disease of the brain methodically if we confuse psychical states with nervous states. We must be thoroughly

materialistic in our method so far as is practicable. What will be said later on on psychical states is said in order that we may study without psychological bias the material basis of mental disorders; that we may see how to investigate in a brutally materialistic manner. I consider what we may metaphorically call stages in dissolution of mind simply to get to know the corresponding stages of dissolution of the nervous system. In some of the earliest of the following sections this distinction will seem to many to be occasionally ignored. I sometimes speak of mental symptoms "from" disease of highest cerebral centres, along with physical symptoms from disease of lower centres. It would seem to some that one ought at once to insist on the distinction. But to those readers who have only considered disease clinically, and who make no distinctions betwixt psychology and the anatomy and physiology of the nervous system, this procedure would be most inconvenient.

In this paper I intend to speak chiefly of temporary conditions of some epileptic patients after their seizures. By these cases we can best illustrate dissolution beginning in the highest centres.

[…]

The question is, how far down in the nervous system there are psychical states during nervous activity. Is the brain the organ of mind, or only the chief part of that organ? I give no opinion on this difficult question. In a footnote to Section III I have referred to the possibility that if there are no mental states when nothing is remembered, there may be activities of special and complex nervous arrangements of the highest centres, which may issue in special and complex movements of elaborate actions. In other words, the patient who acts after a fit, and remembers nothing on recovery, may, for the time, be a mere mechanism or automaton, without any sort of consciousness. For example, of the man who, after one of his seizures, laid and lighted a fire in the bread-pan, and who knew nothing of it on recovery, the reader may suppose, either that the patient had at the time ideas of the bread-pan, of the paper, matches, etc., and some conscious intention, or that there were mere activities of the nervous arrangements, which, had he been well, would have been attended by the conscious states mentioned.

When speaking of difficulty of nomenclature, as to degrees of negative affections of consciousness, the very same question was raised. Let me restate the question: mental states have always concomitant physical states — that is, active states, discharges of, or liberations of energy by, nervous elements; but can we say the reverse — that nervous states always have concomitant psychical states?

Observe, psychical states are not functions of any nervous elements, but attend the functioning of at least some nervous arrangements of those, at least, by which the *most special*, etc., adjustments of the organism as a whole to the environment is effected. That consciousness arises during the activity of the highest arrangements (of those by which most special, etc., adjustments are effected) is not disputable. But now comes the question — Is there any sort of subconsciousness or sensibility or any sort of psychical state, however rudimentary, attending functioning of any lower nervous arrangements ? And, if this be answered in the affirmative, comes the further question — How low down in the nervous system is the concomitance?

I express no opinion on this most difficult question. But were I to make an abrupt limit to the concomitance of psychical with nervous states, I should place the lower limit at the lower motor (Hitzig and Ferrier) and lower sensory (Ferrier's) centres.

[…]

The negative symptoms are directly caused — answer to exhaustion produced straightway by the epileptic discharge. The positive symptoms are indirectly caused, or, it is better to say, are "permitted": they answer to increased activity of lower nervous arrangements, uncontrolled by their now exhausted higher.

[…]

What we called the "survival of the fittest" is here the resultant of two factors: (i) of permitted activity of what is already organised in what is left of the patient; and of (2) the influence of external things, or peripheral conditions interfering with, modifying, the activity of that already organised.

Moreover, a more elaborate state is produced. Thus — to take an illustration from a case outside our proper subject — in the " reduced " brain

of a drunkard, intra-ocular bodies, which would give rise to what are called muscae before his eyes were his brain healthy, develop elaborate nervous states; there is "projection" of more compound images; the patient "sees mice, etc." Speaking very loosely, the muscae "turn into" mice, etc.

[…]

Later on we shall give illustrations from certain post-epileptic states. It is now more simple to illustrate the principle stated in the last section by other cases of insanity. The best plan will be to state more fully the view I take of illusions.

By an illusion I mean what would popularly be called mistaking a thing for something else, as in the instance from the drunkard's case; another instance is taking a coat, thrown partly on the seat, and partly over the back of a chair, to be a man sitting on the chair. I do not believe that disease ever directly "causes" illusions, or any other elaborate positive mental states, although no doubt it indirectly causes them. I believe that disease destroys or places *hors de combat* certain nervous elements or regions of the highest centres, and that not only illusions, but all positive mental symptoms (except "crude sensations") are the outcome of activity of lower-non-diseased nervous arrangements of these highest centres. The disease — the pathological change — causes negative functional states, or places elements of the nervous system *hors de combat*; these negative physical conditions answer to negative mental states. A delirious patient does not "see a rat" "by aid" of diseased "structures," any more than an aphasic says "no," or swears, "by aid" of the softened part of his brain.

All illusions, which are positive mental states, imply of necessity some accompanying negative mental states, answering to what are physically nervous elements *hors de combat* from disease. Manifestly the drunkard spoken of, who "sees a rat," does *not* "see a musca."

[…]

Visual illusions are commoner than others, partly because vision is the most special, most representative, sense; the nervous highest arrangements concerned will be less organised; they will "give out" sooner under conditions affecting the highest centres uniformly. I think that essentially the same holds good of what are called hallucinations. I believe that they are often really illusions, arising from external conditions, from morbid states of periphery parts, or of lower sensory centres. They result from irritations propagated up to the highest centres, that is, to the uncontrolled, and thus over-ready-to-act, nervous arrangements left in these centres. When there is *general* "reduction" of brain, that one patient always "hears voices," and that another always has visions, may depend, I think, on irritations starting from the eyes or from the ear, or from the lowest sensory centres more directly representing those parts, and *not* necessarily on the cerebral visual or auditory centres in particular being diseased; the disease is of some nervous arrangements throughout the highest centres, of those centres which represent all parts of the body.

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